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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.             | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------------------|------------------|
| 10/028,231   | 12/21/2001  | Daniel T. Colbert    | 11321-P011C1D1                  | 4149             |
| 47744  | 7590        | 06/29/2005           |                                 |                  |
| ROSS SPENCER GARSSON<br>WINSTEAD SECHREST & MINICK P.C.<br>P. O. BOX 50784<br>DALLAS, TX 75201 |             |                      | EXAMINER<br>JOHNSTON, PHILLIP A |                  |
|  |             |                      | ART UNIT<br>2881                | PAPER NUMBER     |

DATE MAILED: 06/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/028,231

Applicant(s)

COLBERT ET AL

Examiner

Phillip A. Johnston

Art Unit

2881

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 84-117 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 84-117 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12-11-02; 10-19-04</u> . | 6) <input type="checkbox"/> Other: _____  |

***Detailed Action***

***Claims Rejection - 35 U.S.C. 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 84 and 104 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Uchida, U.S. Patent No. 5, 560,898.

Uchida (898) discloses a method of purifying carbon nanotubes where the nanotubes are isolated from a mixture containing the carbon nanotubes (having a carbon nanotube content of more than, for example, 50% by weight) and graphite particles by a process including the steps of finely pulverizing the mixture; dispersing the pulverized product in a liquid medium; centrifuging the resulting dispersion to obtain a supernatant containing carbon nanotubes and graphite particles having a particle size of 0.3  $\mu\text{m}$  or less; separating the supernatant into a solid phase and a liquid phase; and heating the solid phase in an oxygen-containing atmosphere at a temperature sufficient to burn the graphite particles and to leave the nanotubes.

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As a result of the centrifugation, 70-80% by weight of the graphite particles precipitate, while the remainder of the graphite particles and substantially all of the carbon nanotubes are present in the supernatant.

It is implied herein that use of a nanotube mixture obtained by the Ebbesen arc discharge method in accordance with Uchida (898) is equivalent to the use of single-wall carbon nanotubes, as recited in claims 84 and 104.

It is also implied herein that recovering substantially all of the carbon nanotubes from the original mixture after oxidizing is equivalent to recovering a higher concentration (at least 80%), as recited in claims 84 and 104.

***Claims Rejection – 35 U.S.C. 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 83-103, and 105-117 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uchida, U.S. Patent No. 5, 560,898, in view of Hiura, U.S. Patent No. 5,698,175.

Uchida (898) discloses nearly all the limitations of claims 83-103, and 105-117, but fails to teach;

(a) The use of saponification, as recited in claims 112 and 115;

(b) Neutralizing the mixture with acid, as recited in claims 116 and 117.

However, Hiura (175) discloses a nanotube purification process that incorporates hydrolyzing the nanotube mixture with sodium hydrogencarbonate, as well as treating the nanotube mixture with a solution of sulfuric and nitric acid, as recited in claims 112-117. See Column 4, line 49-65.

Therefore it would have been obvious to one of ordinary skill in the art that the nanotube purification method of Uchida (898) can be modified to use the hydrolyzing and neutralizing methods of Hiura (175), to neutralize the reacted carbon nanotubes, thereby providing a process for easily obtaining highly purified nanotubes.

### ***Conclusion***

4. Any inquiry concerning this communication or earlier communications should be directed to Phillip Johnston whose telephone number is (571) 272-2475. The examiner can normally be reached on Monday-Friday from 6:30 am to 3:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor John Lee can be reached at (571) 272-2477. The fax phone number for the organization where the application or proceeding is assigned is 703 872 9306.

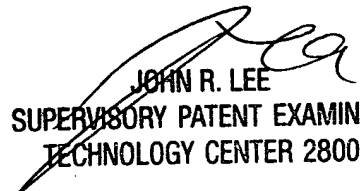
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public

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PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PJ

June 24, 2005



JOHN R. LEE  
SUPERVISORY PATENT EXAMINER  
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